

# A New Molluscan Faunule from the Caribbean Coast of Panama

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## ABSTRACT

The Caribbean coast of Panama, particularly the area around the San Blas Archipelago, has been found to represent part of a new subregion of the Caribbean Molluscan Province, and harbors an endemic gastropod fauna. This new faunal division, referred to here as the Blasian Subregion (for the San Blas Archipelago), characteristically contains a large number of Panamic-Caribbean cognate species pairs, and has a distinctive Panamic appearance. Being predominantly a coralline area in an otherwise muddy region of the Caribbean, the Blasian Subregion also contains numerous taxa that are closely related to coral reef-dwelling species from the Bahamas and Florida. The Blasian Subregion ends abruptly at the Golfo de Uraba, on the Panama-Colombia border and, based on peripheral data, may extend northward to the Costa Rica-Nicaragua border. Sixteen new Blasian species are described, including *Turritella marianopsis* n.sp., *Chicoreus hilli* n.sp., *Dermomurex (Triallatella) euna* n.sp., *Murexiella edwardpauli* n.sp., *Latirus euna* n.sp., *Mitra (Nebularia) leonardi* n.sp., *Prunum leonardhilli* n.sp., *Voluta lacertina* n.sp., *Falsilyria ernesti* n.sp., *Conus brunneofilaris* n.sp., *Conus ernesti* n.sp., *Conus hilli* n.sp., *Conus portobeloensis* n.sp., *Conus rosemaryae* n.sp., *Fusiturricula sunderlandi* n.sp., and *Knefastia hilli* n.sp., and three new Blasian subspecies are described, including *Murex rubidus panamicus* n.subsp., *Oliva (Strophona) reticularis ernesti* n.subsp., and *Conus granarius panamicus* n.subsp.

**Key words:** Caribbean; Panama; gastropods; San Blas Archipelago.

## INTRODUCTION

The southern Caribbean region contains one of the least studied molluscan faunas in the Recent western Atlantic. Although originally thought to house a typical Caribbean tropical molluscan fauna (Valentine, 1973:356), the coastlines of eastern Central America and northern South America are now known to harbor geographically discrete faunules, each differing from one another in species composition (Petuch, 1988). Two of these faunules, one along northern Honduras and eastern Nicaragua, and the other along northern Colombia and the Gulf of Venezuela, were found to contain numerous living archaic genera and species complexes that previously were

thought to have been extinct since the late Pliocene (Petuch, 1980, 1981, 1982). These geographically sharply-defined pockets, each with its own characteristic molluscan assemblage, demonstrate that the southern Caribbean is not a faunistically homogeneous region but is, instead, a biogeographical mosaic of small, distinctive faunules.

While the gastropod faunas of coastal Honduras and Nicaragua, and northern Colombia and the Gulf of Venezuela are now better known (Petuch, 1987, 1988), the intervening Caribbean coasts of Costa Rica and Panama have been, to date, poorly studied. Only a single large detailed work has ever been published on the molluscan systematics of this area (Olsson & McGinty, 1958). That paper, however, concentrated on the micromollusca and small macromollusca that were collected in beach drift near Bocas del Toro and Colon, Panama. Nevertheless, the authors described a number of unusual new species (some of which are listed later in this paper) and demonstrated that the Panama coast did not have a typical West Indian-type Caribbean fauna. Houbriek (1968) further showed that several of Olsson and McGinty's new Panama species were also present at Portete, Costa Rica. These range extensions indicate that the Caribbean coasts of Panama and Costa Rica harbor a fourth Central American-northern South American faunal subregion. A year later, Radwin (1969) published a species list of macromollusks that had been collected from dredged spoil piles near Colon. By incorporating the taxa of Olsson and McGinty, this smaller work became the first, and only, compendium of the molluscan fauna of this fourth faunal subregion.

Unlike the Honduran and Colombian mainlands, which have large areas of muddy coastline (*i.e.*, the Gulf of Uraba), the Caribbean coasts of Panama and Costa Rica contain large areas of coral reefs and coralline algal rubble bottoms. Typical of these carbonate areas are the reef platform and coral cays of the San Blas Archipelago and the massive coralline algal reefs and ridges along the Portobelo coast and at Moro Tupo (Vermeij, 1978:88-89). While working with local fishermen who trawl offshore of these carbonate areas, several Panamanian malacologists, in particular Mr. James Ernest of Balboa, have

recently collected numerous and important new species of macrogastropods. Since the ranges of the microgastropods of the Caribbean are still very poorly known, the biogeographical implications of Olsson and McGinty's micromollusks, as indicators of a new faunal subregion, are too tenuous. On the other hand, the ranges of the Caribbean macrogastropods, particularly those of the eighteen eutropical index families (Petuch, 1988:6-7), are much better known. In this case, the macrogastropods collected by Mr. Ernest are excellent biogeographical indicators, especially since the ranges of their congeners in Honduras, Nicaragua, Colombia, and Venezuela have recently been established (Petuch, 1987, 1988).

The new taxa described in this paper help to demarcate yet another biogeographical subregion of the Caribbean Molluscan Province. This new subdivision is spatially bounded by the Honduran and Colombian-Venezuelan Subregions (Petuch, 1988; figure 42) and includes the coasts of Costa Rica and Panama. Since the San Blas Archipelago of Panama is the ecological and faunistic archetype, I here refer to this new biogeographical entity as the "Blasian Subregion". Unlike the Honduran and Colombian-Venezuelan Subregions, which contain numerous Pliocene Caribbean relictual taxa, the Blasian Subregion characteristically contains numerous Panamic-Caribbean cognate species pairs (*sensu* Radwin, 1969). Of the nineteen new Blasian taxa described here, seven represent previously-unknown cognate pairs. The other twelve taxa include endemic Blasian members of Caribbean species complexes. Nine gastropod families are represented by the new species, and all of these higher taxa can be used for provincial subdivisional analysis (Petuch, 1988:5-8). Future collecting along the Panama-Costa Rica mainland may uncover sufficient faunistic data to support the elevation of the Blasian Subregion to subprovincial status. At present, not enough information exists concerning the total molluscan fauna and, because of this lack, I prefer to refer to the area as a "subregion".

#### THE BLASIAN GASTROPOD FAUNA

As pointed out by Radwin (1969), the Blasian gastropod fauna bears a striking resemblance to the Panamic fauna of western Central and South America, and in particular, the Bay of Panama. For example, unlike the faunas of the adjoining Honduran and Colombian regions, the Blasian area contains a species of the turrid genus *Knefastia* Dall, 1919 (described here), which is normally considered a classic Panamic group. Of particular interest in the Blasian area is the presence of the bizarre vermetid genus *Stephonomma* Möreh, 1860 (Olsson & McGinty, 1958; Houbriek, 1965; Radwin, 1969). Like *Knefastia*, this characteristic Panamic gastropod is found in the Caribbean only within the Blasian subregion. The small, encrusting vermetid, *Stephonomma myrakeenae* Olsson and McGinty, 1958, lives embedded within the coralline algal ridges along Colon and the San Blas Archipelago, and at Portete, Costa Rica, and is characteristic of the unique Blasian lithothamnion community.

The new Blasian members of gastropod cognate pairs are of particular importance in that they underscore the faunal ties to the Panamic-Eastern Pacific areas. Some newly discovered examples of Caribbean-Panamic cognates, based on new taxa proposed in the systematic section of this paper, include: *Turritella marianopsis* n.sp. and *T. mariana* Dall, 1908; *Dermomurex* (*Trialatella*) *euna* n.sp. and *D. (Trialatella) cunninghamae* (Berry, 1964); *Murexiella edwardpauli* n.sp. and *M. keenae* Vokes, 1970; *Latirus euna* n.sp. and *L. centrifugus* (Dall, 1915); *Mitra (Nebularia) leonardi* n.sp. and *M. (Nebularia) sphoni* Shasky and Campbell, 1964; *Prunum leonardhilli* n.sp. and *P. curtum* (Sowerby, 1833); and *Knefastia hilli* and *K. olivacea* (Sowerby, 1833).

The Atrato Seaway, the last connection between the Pacific and Atlantic Oceans, closed at the end of the Pliocene (Whitmore & Stewart, 1965; Woodring, 1966; Petuch, 1988), and had its eastern opening along what is now the San Blas Archipelago and the Golfo de Uraba. This area, which was the last to be exposed to the Pacific molluscan fauna, would be expected to have the most Panamic-appearing molluscan assemblages in the Caribbean. The recent discovery of whole suites of new cognate gastropods living along the Blasian area supports this hypothesis. The enclave of Panamic mollusks in the Caribbean, however, is geographically small, ranging from near San Juan del Norte, Nicaragua (near the Nicaragua-Costa Rica border) in the west to the Golfo de Uraba in the east. The broad Honduran-Nicaragua continental shelf, which contains the Honduran Subregion, narrows and ends at San Juan del Norte. At that point, the muddy environment of the Nicaraguan coast shifts to the cleaner carbonate environments of Costa Rica and Panama. A similar situation takes place at the western edge of the Golfo de Uraba, indicating that substrate type is the major limiting factor in the configuration and distribution of the southern Caribbean molluscan subregions. The substrate and bathymetric preferences of some of the new taxa are discussed under the individual descriptions in the systematic section. The entire Blasian Subregion, with its attendant faunule appears to occupy a stretch of coastline of only slightly over 800 km.

The following is a listing of some of the macrogastropods that are presently known to be confined to the boundaries of the Blasian Subregion. Most of these belong to key tropical biogeographical index families (as outlined by Petuch, 1988). Several smaller macrogastropods that were described by Olsson and McGinty (1958) are also listed.

- Turbinidae-Liotiinae
  - Arene bitleri* Olsson and McGinty, 1958
- Turritellidae
  - Turritella marianopsis* Petuch, n.sp.
- Vermetidae
  - Stephonomma myrakeenae* Olsson and McGinty, 1958
- Cerithiidae
  - Cerithium caribbaeum* M. Smith, 1946

## Muricidae

- \**Chicoreus emilyae* Petuch, 1987  
*Chicoreus hilli* Petuch, n.sp.  
*Dermomurex cuna* Petuch, n.sp.  
*Murexiella edwardpauli* Petuch, n.sp.  
*Murex rubidus panamicus* Petuch, n.sp.

## Fasciolaridae

- Latirus cuna* Petuch, n.sp.

## Columbellidae

- Nassarina dubia* Olsson and McGinty, 1958

## Olividae

- Oliva reticularis ernesti* Petuch, n.subsp.  
*Olivella chiriquiensis* Olsson, 1956  
*Olivella marmosa* Olsson and McGinty, 1958

## Marginellidae

- Gibberula bocasensis* Olsson and McGinty, 1958  
*Persicula weberi* Olsson and McGinty, 1958  
*Prunum leonardhilli* Petuch, n.sp.

## Mitridae

- Mitra (Nebularia) leonardi* Petuch, n.sp.

## Volutidae

- Falsilyria ernesti* Petuch, n.sp.  
*Voluta lacertina* Petuch, n.sp.  
*Voluta lindae* Petuch, 1987

## Conidae

- Conus brunneofilaris* Petuch, n.sp.  
*Conus ernesti* Petuch, n.sp.  
*Conus granarius panamicus* Petuch, n.subsp.  
*Conus hilli* Petuch, n.sp.  
*Conus portobeloensis* Petuch, n.sp.  
*Conus rosemaryae* Petuch, n.sp.

## Turridae

- Fusiturricula sunderlandi* Petuch, n.sp.  
*Knepfastia hilli* Petuch, n.sp.

## SYSTEMATIC SECTION

The type material of the following new species is deposited in the collection of the Division of Mollusks, National Museum of Natural History, Smithsonian Institution, Washington, D.C., and bears USNM numbers:

## Gastropoda

## Prosobranchia

## Caenogastropoda

## Cerithiacea

\* *Note:* Due to an error in my field notes, I incorrectly gave the type locality of *Chicoreus emilyae* as "off Punta Patuca, Honduras" (Petuch, 1987:65). This erroneous type locality is here emended to "Bocas del Toro, Panama", the locality of the paratype. The other paratypes that came from "off Roatan Is., Honduras", appear to represent another, undescribed *Chicoreus* species, and not *E. emilyae*. *Chicoreus emilyae* has now been found to be a true Blasian endemic. This is probably the "*Chicoreus florifer*" listed by Radwin (1969:23f).

## Family Turritellidae

Genus *Turritella* Lamarck, 1799

*Turritella marianopsis* new species  
 (figures 1–3)

**Material examined:** Holotype—Length 58 mm, trawled by commercial fishermen from 65 m depth off Portobelo, Panama, USNM 860523; Paratypes 1–3—same locality and depth as holotype, lengths 52, 44 and 47 mm, USNM 860524.

**Description:** Shell tightly coiled, very elongated, classically turritelliform; whorls with 2 large cords, with the anterior cord being better developed and projecting farther from shell than posterior cord; 2 large cords strongly beaded, giving shell rough appearance; 2 smaller, thin, beaded threadlike cords present between 2 large cords, and 1 thin beaded cord present between posterior cord and suture; shell color brownish-tan with numerous closely-packed, thin, darker brown longitudinal flammules; early whorls pale whitish-tan; beaded cords with alternating light tan and dark brown spots, giving shell speckled appearance; base of shell light tan with scattered tan flammules; aperture wide, slightly rectangular in shape.

**Etymology:** Named for the new species' resemblance to the Panamic *Turritella mariana* Dall, 1908 (. . . "looking like *mariana*").

**Discussion:** *Turritella marianopsis* is morphologically closest to the Panamic *T. mariana* Dall, 1908, especially in shell shape, color pattern, and number of spiral cords, but differs primarily in being more coarsely sculptured, with larger beading and stronger, more elevated spiral cords. Otherwise, the two species are very similar and form an excellent example of a Panamic-Caribbean cognate pair. According to local collectors, *T. marianopsis* is an abundant species at depths of around 60 m, and apparently forms solid beds off the Portobelo coast.

## Muricea

## Muricidae

*Chicoreus* Montfort, 1810

*Chicoreus hilli* new species  
 (figures 4, 5)

**Material examined:** Holotype—Length 26 mm, trawled by commercial fishermen from 65 m depth off Portobelo, Panama, USNM 860525; Paratypes 1, 2—lengths 24 and 26 mm, same locality and depth as holotype, Leonard Hill collection; Paratype 3—length 24 mm, same locality and depth as holotype, USNM 860526.

**Description:** Shell small for genus, fusiform in shape, thin and delicate; 3 well developed varices per whorl; each body varix ornamented with 4 spines—one large spine on shoulder, one small spine at midbody, and 2 small spines clumped together at body whorl-siphonal canal junction; large spine on shoulder 4 times length of smaller spines; small, scalelike spines sometimes present

between larger spines on varix; varical spines open, cupped, ramose; intervarical areas ornamented with one large, elongated knob; body whorl sculptured with 12–13 thin, raised spiral cords; one or more very fine secondary threads present between cords; siphonal canal very elongated, narrow, ornamented with 3 large, flattened spines per varix; spiral cords and threads on body whorl and siphonal canal minutely scaled; aperture proportionally large, ovate; shell color light brownish-tan, with varices and intervarical knobs being of darker chestnut brown.

**Etymology:** Named for Mr. Leonard C. Hill of Miami, Florida, who recognized the species as new and who kindly donated the type material.

**Discussion:** *Chicoreus hilli* is closest to *C. mergus* Vokes, 1974 from Florida, the West Indian Arc, and northern South America, but differs in being a smaller, thinner, more elongated shell with proportionally much larger spines. The varices of *Chicoreus mergus* are very thick and rounded, giving the shell a compact, squat appearance. The varices of *Chicoreus hilli*, on the other hand, are much thinner and sharper, giving the shell a more elongated, graceful appearance. The siphonal canal of *C. hilli* is also much narrower and proportionally much longer than that of *C. mergus*. The shoulder spine of *C. hilli* is also proportionally at least twice as long as the shoulder spine of *C. mergus*.

*Chicoreus hilli* is also similar to *Chicoreus bullisi* Vokes, 1974, from off Nicaragua, but differs in being a much smaller, much more delicate shell with smaller and less-developed varical spines. The varices of *C. bullisi*, like those of *C. mergus*, are also much thicker, wider, and more rounded than those of *C. hilli*. The new species is the smallest known *Chicoreus* in the western Atlantic, and appears to be restricted to the coralline algal and carbonate rubble areas off Portobelo and the San Blas Archipelago.

*Dermomurex* Monterosato, 1890

*Trialatella* Berry, 1964

*Dermomurex* (*Trialatella*) *cuna* new species (figures 9, 10)

**Material examined:** Holotype—Length 14 mm, trawled by commercial fishermen from 65 m depth off Portobelo, Panama. USNM 860527; Paratype 1—length 13 mm, same locality and depth as holotype, Leonard Hill collection, Miami, Florida.

**Description:** Shell elongated, fusiform, thin and fragile; early whorls with 6 small thin varices per whorl; body whorl and penultimate whorl with 3 large, thin, winglike varices per whorl; body whorl ornamented with 6 low flattened cords with cord along shoulder being strongest and best developed; cords extend onto winglike varices, producing slightly scalloped edges; cords of intervarical areas ornamented with small, evenly-spaced nodules; siphonal canal elongated, well developed, slightly recurved; aperture proportionally large, oval in shape; entire shell covered with thick, cream-white, pebbled intritacalx; surface of intritacalx of varices finely striate.

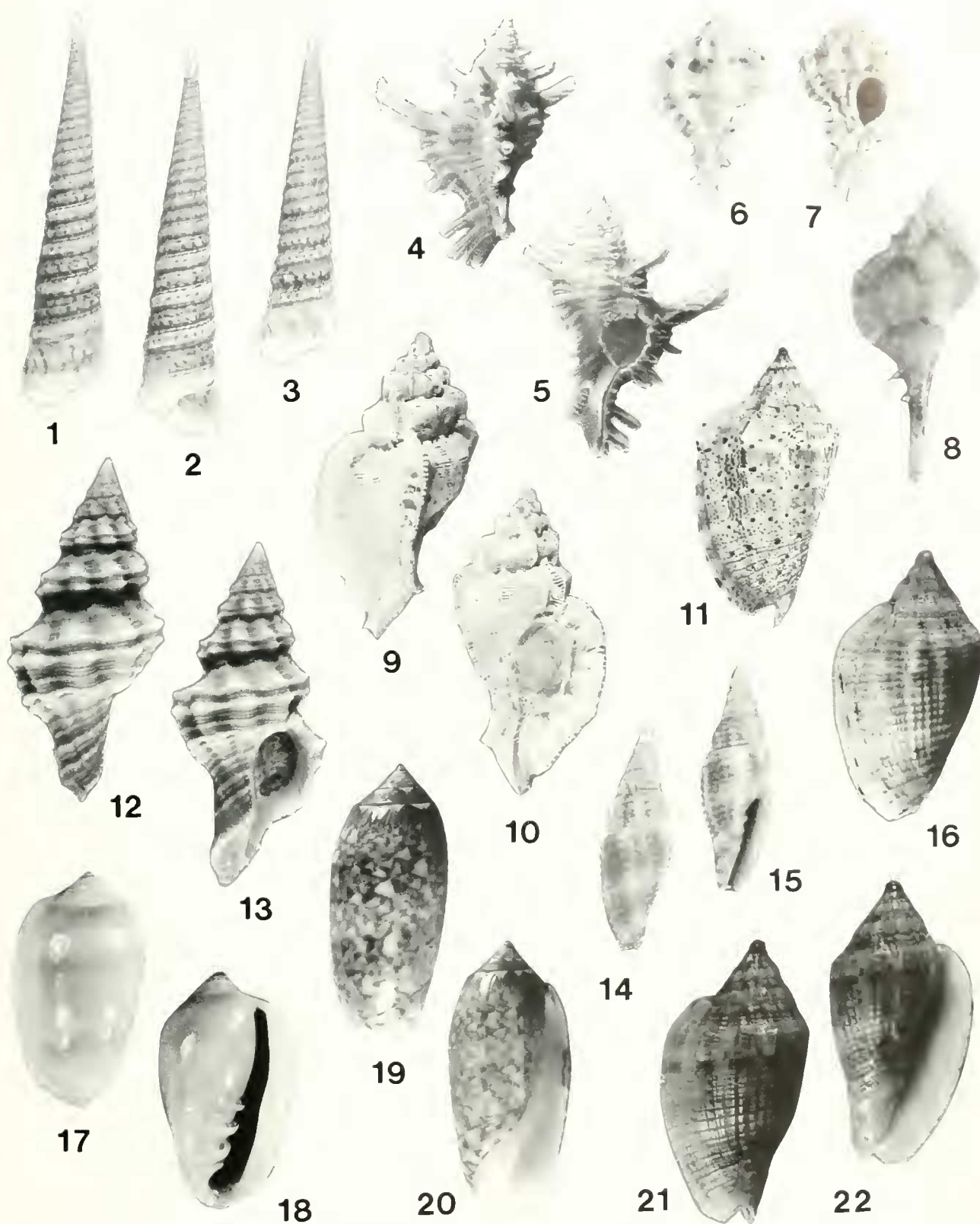
**Etymology:** Named for the Cuna Indians of the San Blas Archipelago.

**Discussion:** *Dermomurex* (*Trialatella*) *cuna* is the fifth-known member of its three-winged subgenus to be found in the western Atlantic. The other species include *D. abyssicola* (Crosse, 1865) from Guadeloupe, French Antilles, *D. glicksteini* Petuch, 1987 from southeastern Florida, *D. kaicherae* Petuch, 1987 from Venezuela, and *D. oxum* Petuch, 1979 from the Abrolhos Archipelago, Brazil. Of the Atlantic species, *D. cuna* is closest to *D. kaicherae*, but differs in being a more broad-shouldered shell with a proportionally lower spire, and in being a smoother, less sculptured shell lacking the broad, thick intervarical cords and knobs of *D. kaicherae* (Petuch, 1987: plate 24, figures 17, 18). Of the known *Trialatella* species, *D. cuna* is closest to the Panamic *D. cunninghamae* (Berry, 1964), the type of the subgenus, and the two form an obvious cognate pair. The new Caribbean species differs from its Panamic cognate in being a more elongated, slender shell with a proportionally higher spire and less developed winged varices. The form and number of the body whorl cords and the structure of the intritacalx of the two species, however, are very similar.

Vokes (1975: plate 4, figures 3a,b) illustrated a smaller specimen of *D. cuna* from "Holandes Cay, off Cape San Blas, Panama, 22 fathoms" but referred it to the Lesser Antilles species *D. abyssicola*. She later reillustrated the same specimen (Vokes, 1985: figures 13a,b), but this time referred the Panamanian shell to the Brazilian *D. oxum*. This now well-known specimen of *D. cuna*, however, is a juvenile (with 6 varices) of only 9 mm length, and does not exhibit the adult proportions. Fully mature, three-winged specimens of *D. cuna* (approximately 13 mm) and *D. oxum* (holotype 12.5 mm) are quite different, with *D. oxum* being a much broader, stockier shell with wider body whorl cords and elongated intervarical knobs. Although similar to, and often confused with *D. abyss-*

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Figures 1–22. New gastropods from the Caribbean coast of Panama. 1, 2. *Turritella marianopsis* new species, holotype, length 55 mm, USNM 860525. 3. *Turritella marianopsis* new species, paratype, length 52 mm, USNM 860524. 4, 5. *Chicoreus hilli* new species, holotype, length 26 mm, USNM 860525. 6, 7. *Murexiella edwardpauli* new species, holotype, USNM 860529. 8. *Murex rubidus panamicus* new subspecies, holotype, length 26 mm, USNM 860528. 9, 10. *Dermomurex* (*Trialatella*) *cuna* new species, holotype, length 14 mm, USNM 860527. 11. *Voluta virescens* Lightfoot, 1786, 43 mm specimen from Cartagena, Colombia, for



comparison with *Voluta lacertina*. 12, 13. *Latirus cuna* new species, holotype, length 46 mm, USNM 860531 14, 15. *Mitra (Nebularia) leonardi* new species, holotype, length 22 mm, USNM 860533. 16. *Voluta lacertina* new species, paratype, length 29 mm, USNM 860538. 17, 18. *Prunum leonardhilli* new species, holotype, length 19 mm, USNM 860536. 19, 20. *Oliva (Strephona) reticularis ernesti* new species, holotype, length 35 mm, USNM 860535 21, 22. *Voluta lacertina* new species, holotype, length 31 mm, USNM 860537.

*sicola*. *D. cuna* is a larger, broader shell with a higher, more obviously stepped spire. The siphonal canals of both *D. oxum* and *D. abyssicola* are neither as elongated nor as well developed as that of *D. cuna*, and are not recurved.

In the fossil record, *D. cuna* is most similar to *D. antecessor* Vokes, 1975 from the early Pleistocene of Costa Rica (Moin Formation) and southern Florida (Bermont Formation). This possible Pleistocene ancestor, however, differs from the Recent Blasian species in being a more elongated species with less developed varices and coarser corded body whorl sculpture.

*Murex* Linnaeus, 1758

*Murex rubidus panamicus* new subspecies  
(figure 8)

**Material examined:** Holotype—Length 26 mm, trawled by commercial fishermen from 50 m depth off Portobelo, Panama, USNM 860528; Paratype 1—length 27 mm, same locality and depth as holotype, Leonard Hill collection, Miami, Florida.

**Description:** Shell small for genus, with fusiform body; spire high, elevated; body whorl and varices rounded; 3 large, thick varices per whorl; 2–3 narrow, elongated knobs in intervarical areas; body whorl, intervarical knobs, and varices ornamented with 12–14 large, raised spiral cords; thin spiral threads often present between spiral cords; siphonal canal extremely long and narrow, equal to length of shell body; base of siphonal canal ornamented with 2 small spines; aperture small, rounded; peristome ornamented with numerous large white teeth; shell color bright orange with 2 darker orange-tan bands, one around shoulder and one around body whorl-siphonal canal junction; posterior half of siphonal canal brown; anterior half of siphonal canal pale orange-white.

**Etymology:** Named for Panama, the country of the type locality.

**Discussion:** *Murex rubidus* Baker, 1897 is now known to have a split distribution within the Caribbean region, with the nominate subspecies, *M. rubidus rubidus*, being found along the southeastern and western coasts of Florida and the northern Bahamas (Radwin and D'Attilio, 1976:71), and with a small, isolated population, *M. rubidus panamicus*, being found along Caribbean Panama. Both populations may be relicts of a once wide-ranging Pleistocene species that has become biogeographically bisected and spatially reduced since the late Pleistocene. Several other Blasian species also share close morphological similarities with Bahamian gastropods. Included are the Blasian *Chicoreus emilyae* Petuch, 1987 and the Bahamian-Floridian *C. florifer* Reeve, 1846 and the Blasian *Conus hilli* n. sp. and the Bahamian *Conus jueundus* Sowerby, 1857 (= *C. abbotti* Clench, 1942).

*Murex rubidus panamicus* differs from the nominate subspecies in being a much more slender, more fusiform shell with a much higher, more protracted spire. The body whorl of *M. rubidus rubidus* is rounded and glo-

bose, while the body whorl of *M. rubidus panamicus* is narrower and elongated

*Murexiella* Clench and Farfante, 1945

*Murexiella edwardpauli* new species  
(figures 6, 7)

**Material examined:** Holotype—Length 15 mm, trawled by commercial fishermen from 50 m depth off Portobelo, Panama, USNM 860529; Paratype 1—length 15 mm, same locality and depth as holotype, USNM 860530.

**Description:** Shell small for genus, thin, delicate, with globose, inflated body; 6 varices per whorl, varices thin, with 6 large, recurved spines; intervarical areas ornamented with 6 large spiral cords; intervarical cords and varices minutely squamose; siphonal canal proportionally very elongated, ornamented with 3 large, flattened spines per siphonal varix; shell consistently pinkish-tan colored with 2 darker tan bands, one around shoulder and one around midbody; shoulder of body whorl slightly angled; aperture proportionally large, oval in shape.

**Etymology:** Named for Mr. Edward D. Paul of Miami, Florida.

**Discussion:** *Murexiella edwardpauli* is closest to *Murexiella macgintyi* (Smith, 1938) from Florida and the Bahamas, but differs in being a much smaller, more delicate species with a much more globose body whorl, less angled shoulder, and proportionally longer and narrower siphonal canal. *Murexiella edwardpauli* is also similar to *M. leonardhilli* Petuch, 1987 from Brazil, but differs in being a much smaller shell with thinner, less crassate varices. In the eastern Pacific, *M. edwardpauli* is very similar to *M. keenae* Vokes, 1970, but differs in being a smaller shell with a proportionally longer siphonal canal. Based on shell morphology, *M. keenae* and *M. edwardpauli* can be seen to be very closely related and represent Panamic-Caribbean cognates.

Fascioliariidae

Peristerniinae

*Latirus* Montfort, 1810

*Latirus cuna* new species  
(figures 12, 13)

**Material examined:** Holotype—Length 46 mm, trawled by commercial fishermen from 60 m depth off Portobelo, Panama, USNM 860531; Paratype 1—length 42 mm, same locality and depth as holotype, USNM 860532; Paratype 2—length 45 mm, same locality and depth as holotype, collection of Leonard Hill, Miami, Florida.

**Description:** Shell elongately fusiform, with high, scalariform spire and narrow protracted siphonal canal; shoulder sharply angled, with rounded, spikelike knobs; whorls with 8 narrow, raised axial ribs per whorl; axial ribs overlaid with 5 large, thick spiral cords; 2 spiral cords at shoulder largest and best developed, projecting farthest from shell body; areas between large cords or-

namented with numerous very fine cords and spiral threads; siphonal canal ornamented with 4 large spiral cords; areas between large siphonal cords ornamented with numerous fine cords and threads; interior of aperture with 10–12 large, beaded cords; edge of lip finely crenulated, with crenulations corresponding to fine spiral cords and threads on shell surface; narrow umbilicus present; shell color bright orange-tan; large cords of body whorl, spire, and siphonal canal white; interior of aperture orange.

**Etymology:** Named for the Cuna Indians of the San Blas Islands.

**Discussion:** *Latirus cuna* somewhat resembles the widespread Caribbean *L. cariniferus* Lamarck, 1822, but differs in being a more slender, elongated shell with a narrower, more protracted siphonal canal, and in having a more sharply-angled shoulder with proportionally larger and sharper shoulder knobs. The new Blasian species is also similar to the Panamic *L. centrifugus* (Dall, 1915), but differs in being a more slender, elongated shell with a proportionally longer siphonal canal. Otherwise, both *L. centrifugus* and *L. cuna* share the same type of sharply-angled shoulder, large shoulder knobs, and strongly projecting shoulder cords. I feel it is safe to assume that *L. cuna* and *L. centrifugus* form a cognate species pair.

Volutacea

Mitridae

*Mitra* Lamarck, 1798

*Nebularia* Swainson, 1840

*Mitra* (*Nebularia*) *leonardi* new species  
(figures 14, 15)

**Material examined:** Holotype—Length 22 mm, trawled by commercial fishermen from 60 m depth off Portobelo, Panama, USNM 860533; Paratype 1—length 20 mm, same locality and depth as holotype, USNM 860534.

**Description:** Shell narrow and elongated, fusiform; spire high, protracted, scalariform; suture indented, producing narrow shoulder area and stepped spire whorls; body whorl ornamented with 12 large, thick spiral cords; columella with 4 plications, with posteriormost plications being largest; shell color white, heavily overlaid with wide, reddish brown vertical flammules; reddish-brown flammules often coalesce into large, longitudinal patches; some specimens (holotype) with thin white band around midbody; aperture thin, narrow, roughly one-half length of shell.

**Etymology:** Named for Mr. Leonard C. Hill of Miami, Florida who kindly donated the type material.

**Discussion:** In the Caribbean, *Mitra leonardi* is closest to *M. semiferruginea* Reeve, 1845, from the Bahamas, but differs in being a smaller, much narrower shell with a proportionally larger aperture. The two species also differ in color; with *M. semiferruginea* being colored bright yellow with dark, blackish-brown flammules and with *M. leonardi* being white with reddish-brown flam-

mules. In the eastern Pacific, *M. leonardi* is closest to *M. sphoni* Shasky and Campbell, 1964, especially in size and color, but differs in having a more scalariform, stepped spire. *Mitra sphoni* and *M. leonardi*, together, are another example of a Panamic-Caribbean cognate species pair.

Olividae

*Oliva* Bruguiere, 1789

*Strephona* Mörch, 1852

*Oliva* (*Strephona*) *reticularis ernesti* new subspecies  
(figures 19, 20)

**Material examined:** Holotype—Length 38 mm, trawled from 40 m depth on silty sand bottom off Portobelo, Panama, USNM 860535; Paratypes 1–3—lengths 37–41 mm, same locality and depth as holotype, Petuch collection.

**Description:** Shell average size for subgenus, cylindrical, with only slightly rounded shoulder; spire low; body whorl colored yellowish-tan, overlaid with dense, close-packed pattern of small, dark brown triangles and zigzags; 2 wide bands of darker brown triangles present around body whorl, one around anterior one-third and one around area just posterior of midbody line; sutural area marked with large, evenly-spaced yellow patches and numerous fine black hairlines; spire whorls glazed-over with dark purple-brown enamel; aperture and columellar area white; columella with 15–20 thin plicae; fasciole yellow-tan marked with 2 rows of large dark brown checkers; protoconch proportionally small, colored dark purple-brown.

**Etymology:** Named for Mr. James Ernest of Balboa, Panama, who collected the type lot.

**Discussion:** *Oliva reticularis ernesti* from the Blasian area differs from *O. reticularis reticularis* Lamarck, 1810, from the Bahamas and West Indian Arc, in being a more straight-sided, cylindrical shell with a much lower spire. The new subspecies is also a darker-colored shell with a finer and denser pattern of triangle markings. *Oliva reticularis ernesti* occurs with, and has often been confused with, *Oliva bewleyi* Marrat, 1871. That species, however, is a much larger shell (av. 55 mm) with a proportionately higher spire and larger protoconch. *Oliva bewleyi* has a much more diffuse color pattern, with the triangle markings and zigzags having a “smeared” look. The triangle markings of *O. reticularis ernesti*, on the other hand, are consistently clear and distinct. Although *O. bewleyi* is now known to range from Panama to Santa Marta, Colombia (Petuch & Sargent, 1986:126), *O. reticularis ernesti* appears to be restricted to the Blasian area.

Marginellidae

*Prunum* Hermannsen, 1852

*Prunum leonardhilli* new species  
(figures 17, 18)

**Material examined:** Holotype—Length 19 mm, trawled from 60 m depth by commercial fishermen, off Portobelo,

Panama, USNM 860536. Paratypes 1, 2—lengths 18 mm and 19 mm, same locality and depth as holotype, Leonard Hill collection.

**Description:** Shell elongated, ovate, somewhat inflated; base of shell flattened anteriorly, bordered by thickened parietal callus that connects with thickened outer lip around anterior end; margins of shell thickened; spire relatively low; columella with 4 very large plications that extend beyond aperture region onto shell base; aperture narrow, slightly wider at anterior end; shell pale bluish-gray color with 2 darker gray bands; thickened lip and basal callus white; junction of body whorl and lip marked by thin yellow line; body whorl-lip junction area suffused with pale yellow color; interior of aperture bright orange-brown; protoconch and early whorls pale orange-tan.

**Etymology:** Named for Mr. Leonard C. Hill of Miami, Florida, who kindly donated the holotype.

**Discussion:** *Prunum leonardhilli* is very similar to *P. curtum* (Sowerby, 1832) from the coasts of Ecuador and Peru, as both species share the same shell shape, shell size, and form of the columellar plications. *Prunum curtum*, however, is a yellow shell with a pale orange outer lip, while *P. leonardhilli* is basically a blue-gray shell with a white outer lip. Regardless of color, the two species appear to be cognates. In the Caribbean *P. leonardhilli* is closest to *P. prunum* (Gmelin, 1791), which is abundant and widespread along the coasts of Colombia and Venezuela. The new Panamanian species differs from the common *P. prunum*, however, in being a smaller, more globose, and less elongated shell, with much larger columellar plications. The columellar plications of *P. prunum* do not extend as far onto the shell base as do those of *P. leonardhilli*. The two species also appear to be ecologically exclusive, with *P. prunum* preferring the organic-rich coastal muds and *P. leonardhilli* preferring fine particulate carbonate bottoms in offshore areas. *Prunum leonardhilli* is sympatric with another Blasian marginellid endemic, *Persicula weberi* Olsson and McGinty, 1958.

Voluntidae

Volutinae

*Voluta* Linnaeus, 1758

*Voluta lacertina* new species

(figures 16, 21, 22)

**Material examined:** Holotype—Length 31 mm, trawled by commercial fishermen from 100 m depth off Portobelo, Panama, USNM 860537; Paratype 1—length 29 mm, same depth and locality as holotype, USNM 860538;

Paratype 2—length 30 mm, same depth and locality as holotype, Leonard Hill collection.

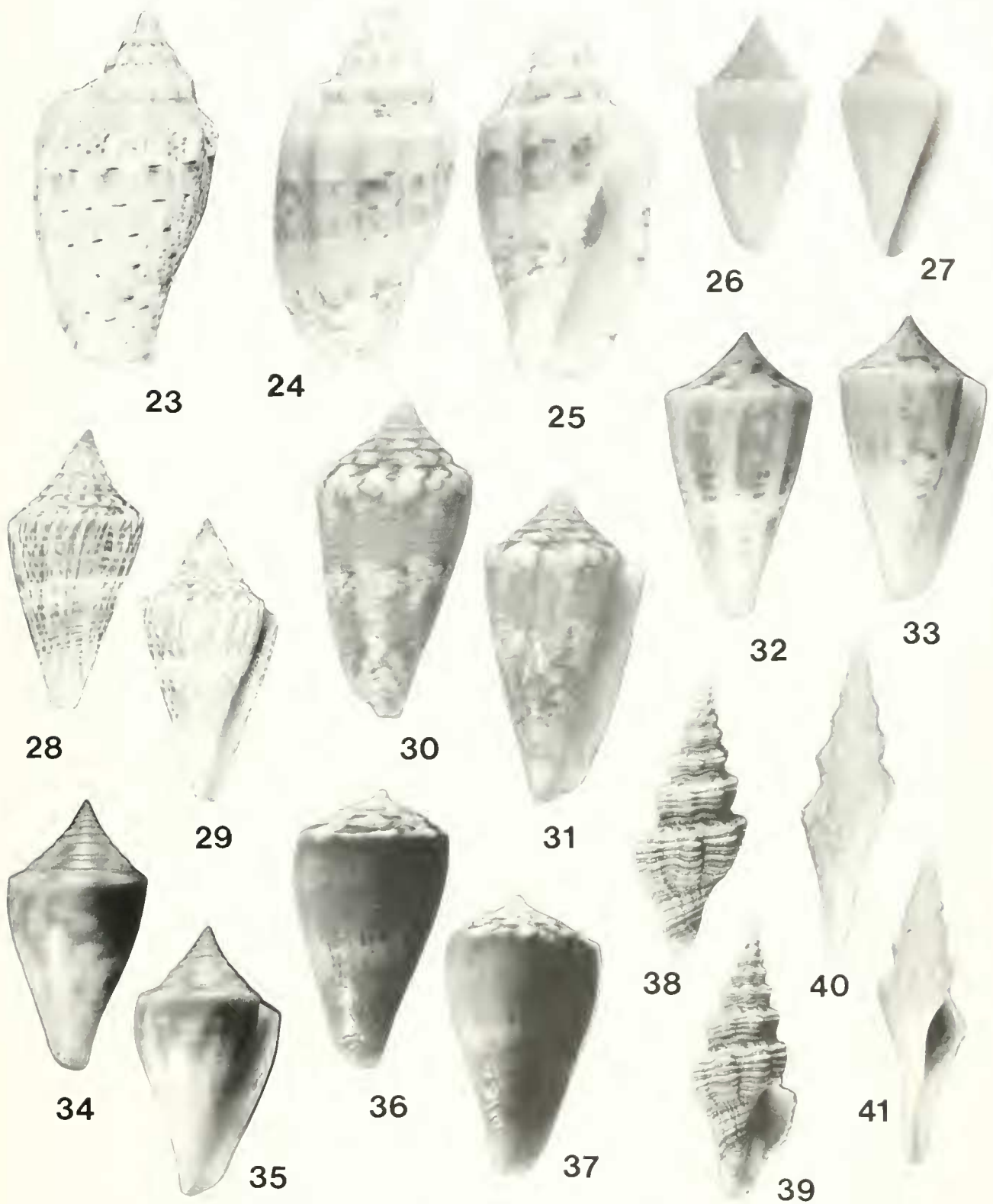
**Description:** Shell very small for genus, averaging only 30 mm in length; shell outline broadly fusiform, tapering toward anterior end; spire elevated; shoulder rounded, ornamented with 10–12 low, riblike knobs; body whorl ornamented with 20–24 horizontally-arranged, deeply incised spiral sulci and numerous thin longitudinal plicae; sulci and plicae intersect to produce strong cancellate sculpture pattern; intersection of pair of sulci and plicae producing large, raised bead, giving entire surface of body whorl pebbly appearance; subsutural area ornamented with 6 large spiral cords; shell color yellowish-tan overlaid with numerous minute brown dots and 3 bands of large light brown rectangular patches, one along suture, one below shoulder, and one around anterior end; protoconch proportionally large, composed of 2 whorls, flattened and somewhat discoidal; protoconch asymmetrical in form, with first whorl projecting dorsally out of alignment with second whorl; protoconch light brown in color; aperture wide, yellow to pale orange in interior; columella with 10 large, thin, smooth plications; thin, small, secondary plications sometimes present between anteriormost primary plications; outer lip of adults thickened, marked with 10–12 small brown spots; operculum unknown.

**Etymology:** “Little lizard”, in reference to the new species’ beaded appearance, which resembles lizard skin.

**Discussion:** *Voluta lacertina* is the smallest-known *Voluta* s.s. and is also the deepest-dwelling, having been trawled from 100 m depth. All other *Voluta* s.s., and members of the closely-related *Falsilyria* Pilsbry and Olsson, 1954 species complex, prefer depths of 30 to 50 m and some are often collected by SCUBA diving (such as *Falsilyria sunderlandi* Petuch, 1987 from 10 m depth off Utila Island, Honduras). At Cartagena, Colombia, the closely-related *Voluta virescens* Lightfoot, 1786 is found in shallow subtidal depths and frequently is collected as beach specimens.

*Voluta lacertina* is most similar to the other Blasian endemic volute, *V. lindae* Petuch, 1987 (figure 23), but differs in being a smaller, more heavily sculptured shell with a more rounded shoulder. The sculpture pattern of the two species also differs, with *V. lacertina* having a pebbly, beaded surface texture and with *V. lindae* having stronger longitudinal plicae that give the shell a wrinkled look. The shoulder knobs of *V. lacertina* are weak and rounded, while those of *V. lindae* are strong, angled, and sharply pointed. *Voluta lindae* is also a more brightly colored shell, being an intense yellow or yellow-orange and having large, dark brown spots in rows around the body whorl. *Voluta lacertina*, on the other hand, is a





24 mm, USNM 860543. **28, 29.** *Conus ernesti* new species, holotype, length 29 mm, USNM 860542 **30, 31.** *Conus brunneofilaris* new species, holotype, length 14 mm, USNM 860541. **32, 33.** *Conus portobeloensis* new species, holotype, length 31 mm, USNM 860545 **34, 35.** *Conus rosemaryae* new species, holotype, length 25 mm, USNM 860546. **36, 37.** *Conus hilli* new species, holotype, length 21 mm, USNM 860544. **38, 39.** *Knefastia hilli* new species, holotype, length 50 mm, USNM 860545 **40, 41.** *Fusiturricula sunderlandi* new species, holotype, length 33 mm, USNM 860547.

drab little shell, being a pale tan or yellowish-tan and lacks the large, scattered brown spots seen on *V. lindae*. Both species, however, have the same fine-dotted pattern that covers the entire shell, although the dots of *V. lindae* are proportionally larger and darker. The protoconchs of the two species also differ significantly, with that of *V. lindae* being inflated and cylindrical in form, while that of *V. lacertina* is flattened and asymmetrical. Bathymetrically, the two species also differ, with *V. lacertina* living at depths of 100 m or deeper and with *V. lindae* preferring much shallower areas of 20 to 50 m depth.

*Voluta lacertina* is also similar to the well known *V. virescens* (figure 11), which ranges from off Nicaragua to Santa Marta, Colombia, and the two species appear to represent a pair of bathymetric siblings. As in *V. lindae*, *V. virescens* prefers shallower depths, ranging from 5 to 35 m. The substrate preferences of these three closely-knit species also appear to differ, with *V. lacertina* and *V. lindae* preferring coralline algal rubble and carbonate bottoms and with *V. virescens* preferring muddy, organic-rich bottoms. *Voluta virescens* from the organic detrital and reducing substrates within the Golfo de Uraba, on the Panama-Colombia border, are stained black from reduced iron compounds and are often encrusted with iron sulfide. *Voluta lindae* and *V. lacertina*, from the cleaner carbonate substrates of the Blasian area, are usually shiny and uncoated by iron compounds.

Morphologically, *V. virescens* differs from *V. lacertina* in being a larger shell with a smooth shell sculpture that lacks the pebbly beading. The basic shell coloring also differs between the two species, with *V. virescens* being a characteristic green or greenish-gray while *V. lacertina* is a pale yellow-tan. The protoconch of *V. virescens* is proportionally smaller than that of *V. lacertina*, being narrow and cylindrical in form. The protoconch of *V. lacertina* is large for such a small shell, and is flattened and almost discoidal in form. Interestingly enough, although *V. virescens* is the largest species of the Panamanian-Colombian *Voluta* species complex, it has a proportionally much smaller protoconch than those of its diminutive relatives, *V. lindae* and *V. lacertina*.

*Falsilyria* and Pilsbry and Olsson, 1954

*Falsilyria ernesti* new species  
(figures 24, 25)

**Material examined:** Holotype—Length 54 mm, trawled by commercial fishermen from 65 m depth off Portobelo, Panama, USNM 860539; Paratype 1—length 55 mm, same locality and depth as holotype, USNM 860540; Paratype 2—length 54 mm, same locality and depth as holotype, Leonard Hill collection, Miami, Florida.

**Description:** Shell narrow, elongated, fusiform, thick and heavy, spire elevated, protracted; spire whorls slightly convex in outline, whorls ornamented with 8–10 large, rounded, axial plications. Large plications overlaid with numerous thin, riblike plications; shoulder angled, bordered by single large spiral cord; subsutural areas sculptured with 3 large spiral cords, subsutural spiral cords

intersect with thin axial riblets to produce beaded texture on shoulder and spire; body whorl shiny, polished; anterior end sculptured with 5–6 large spiral cords; columella slightly arcuate, with 11–12 thin, smooth plications; outer lip of adults thickened, projecting posteriorward; protoconch proportionally large, rounded, domelike; shell color pale salmon-yellow with 2 wide bands of brown and pale purple checkers and spots, one around midbody and one around anterior end; midbody band overlaid with 4–6 brown spiral hairlines and numerous tiny brown vertical flammules; anterior band similarly marked with 5 brown hairlines and tiny vertical flammules; salmon-yellow areas between wide colored bands completely overlaid with closely-packed, tiny orange-brown speckles; protoconch light tan; columella and interior of aperture pale salmon; edge of lip yellowish-white, marked with evenly-spaced dark brown spots.

**Etymology:** Named for Mr. James Ernest of Balboa, Panama, who collected the type lot.

**Discussion:** Of the *Falsilyria* species complex, *F. ernesti* is the southernmost known member, and its discovery came as a surprise to me. Previously (Petuch, 1987:62), I had stated that the genus was restricted to the coasts of Honduras and northern Nicaragua. The new Blasian species, therefore, represents a considerable range extension for the complex. Of the eight known *Falsilyria* species, *F. ernesti* is most similar to *F. demarcoi* (Olsson, 1965) from Honduras, but differs in being a much smaller, more slender and elongated shell, with a much more sharply-angled shoulder. The Honduran *F. demarcoi* is also a much more brightly colored shell, having a deep orange base tone. The Blasian *F. ernesti*, on the other hand, is a less colorful shell, having a base tone of pale salmon-yellow. In shape and in having a small adult size, *F. ernesti* is also similar to *F. harasewychi* Petuch, 1987, from off Roatan Island. The new species differs from *F. harasewychi*, however, in having a salmon-yellow base color instead of white, and in lacking the wine-red flammules and black and white checkered bands of *F. harasewychi*. The Roatan species has distinctive, characteristic beaded columellar plications, while those of *F. ernesti* are smooth.

Conacea

Conidae

*Conus* Linnaeus, 1758

*Conus brunneoflavis* new species  
(figures 30, 31)

**Material examined:** Holotype—Length 14 mm, trawled by commercial fishermen from 65 m depth off Portobelo, Panama, USNM 860541.

**Description:** Shell small, elongately conical, thin, fragile; shoulder sharply angled, carinated; carina faintly undulating; spire moderately elevated, with stepped whorls; body whorl shiny and polished; anterior tip encircled with 6 small spiral cords; aperture narrow, slightly wider at anterior end; protoconch proportionally large,

mammillate; shell color bright golden-tan with wide midbody band of large white patches and dark brown flammules; anterior tip marked with large white flammules; golden-tan and white base color overlaid with 21 extremely fine, hairlike, dark brown spiral lines; shoulder and spire white with large, evenly-spaced, dark brown flammules; spire flammules extend over edge of shoulder carina onto body whorl; interior of aperture white; protoconch and early whorls bright yellow.

**Etymology:** "Brown threaded", in reference to the prominent, evenly-spaced, thin brown lines that encircle the body whorl.

**Discussion:** *Conus brunneofilaris*, with its distinct brown spiral lines, resembles no other known Caribbean or Panamic cone shell. In shape and size, this unusual new species is most similar to *C. magnottei* Petuch, 1987 from Roatan Island, Honduras, but differs in having a bright golden-tan base color instead of the pink and purple color of *C. magnottei*, and in having the overlay color pattern of brown lines, which is lacking in the Honduran species. The spire flammules of *C. magnottei* are also larger and more irregular than those of *C. brunneofilaris* and do not extend onto the body whorl.

*Conus ernesti* new species  
(figures 28, 29)

**Material examined:** Holotype—Length 29 mm, trawled by commercial fishermen from 65 m depth off Portobelo, Panama, USNM 860542; Paratype 1—length 31 mm, same locality and depth as holotype, Kevan Sunderland collection.

**Description:** Shell slender, tapering rapidly toward anterior tip; shoulder wide, sharply angled; spire high, elevated, scalariform; shell smooth, polished, with deeply-impressed spiral sulci around anterior end; aperture straight, narrow; shell color white with 12–20 rows of small brown dots and dashes; rows of dots often aligned to form large brown vertical flammule; dotted pattern overlaid with variable amounts of amorphous lighter brown patches; clear band, with only one or two rows of dots, present around midbody; some specimens (holotype) with brown patches coalescing into 2 broad bands, one above, and one below, midbody; anterior tip of shell white; spire whorls white with numerous, evenly-spaced crescent-shaped flammules; early whorls brown; interior of aperture white.

**Etymology:** Named for Mr. James Ernest of Balboa, Panama, who collected the holotype.

**Discussion:** *Conus ernesti* is most similar to *Conus cingulatus* Lamarck, 1810 from the Caribbean coast of Colombia, but differs in being a smaller, lighter colored shell with a much higher, scalariform spire. The lower-spired *Conus cingulatus* is a rough-textured shell, with the body whorl being heavily sculptured with incised sulci and raised spiral threads. *Conus ernesti*, on the other hand, is a smooth, almost polished shell, with in-

cised sulci only on the anterior end. The dark purple-brown *C. cingulatus* has a purple aperture, whereas the white and light brown *C. ernesti* has a white aperture.

The new species is also similar to *C. garciai* daMotta, 1982 from the Caribbean coast of Honduras, but differs in being a much smaller shell with rows of brown dots. Like *C. cingulatus*, *C. garciai* is also a rough-textured shell, heavily ornamented with raised threads, and differs greatly from the smooth *C. ernesti*. Together, *C. garciai*, *C. ernesti*, and *C. cingulatus* form an interesting species complex, with each being restricted to a separate molluscan assemblage.

*Conus granarius panamicus* new subspecies  
(figures 26, 27)

**Material examined:** Holotype—Length 24 mm, trawled by commercial fishermen from 40 m depth off Portobelo, Panama, USNM 860543; Paratype 1—length 28 mm, same locality and depth as holotype, Leonard Hill collection.

**Description:** Shell subpyriform, tapering abruptly toward anterior end; shoulder sharply angled, subearinated; spire very high, elevated, protracted; shoulder periphery and spire whorls heavily ornamented with numerous large, rounded beads, producing distinctly coronated spire; body whorl shiny, ornamented with 15–18 evenly-spaced rows of tiny pustules; shoulder and subsutural area flattened, producing pronounced stepped spire; shell color pale lilac, often overlaid with large, vertically-oriented, light tan patches; interior of aperture violet.

**Etymology:** Named for Panama, country of the type locality.

**Discussion:** *Conus granarius panamicus* may represent an isolated population of the wide-ranging *C. granarius granarius*, which ranges from northern Colombia into the Gulf of Venezuela. The new subspecies differs from the nominate subspecies in being a smaller, stumper, more biconically-shaped shell with a proportionally higher and more scalariform spire. *Conus granarius panamicus* also lacks the spiral rows of dots that characterize the color pattern of *C. granarius granarius*, and is a much paler, less colorful shell. Some specimens of *C. granarius panamicus* are uniformly pale lilac (like the holotype), while others have large tan patches. Although the nominate subspecies appears to prefer muddy, siliciclastic sediment bottoms with large amounts of organic matter, *C. granarius panamicus* prefers coralline rubble and carbonate sand bottoms.

It is conceivable that *C. granarius panamicus* may, in fact, be a full species, closely related to, but distinct from, *C. granarius granarius*. The new taxon may be part of a Honduras-Panama-Colombia species complex, much as in the case of *Conus garciai-ernesti-cingulatus*. This species complex, then, would comprise the Honduran *C. harlandi* Petuch, 1987, the Panamanian *C. panamicus*,

and the Colombian *C. granarius*, with each being part of a localized, endemic faunule.

*Conus hilli* new species  
(figures 36, 37)

**Material examined:** Holotype—Length 21 mm, trawled by commercial fishermen from 26 m depth off Portobelo, Panama, USNM 860544.

**Description:** Shell stocky, broad across shoulder; spire low, flattened; shoulder sharply-angled, subcarinated; shoulder and spire whorls obsoletely coronated, with low, evenly-spaced undulations along periphery; body whorl very smooth, polished, shiny; anterior tip with 10 small, slightly raised spiral cords; shell color deep purple-blue with blotchy, light blue band around midbody; light blue midbody band marked with 4 rows of tiny, closely-spaced reddish-brown dots; spire whorls white with evenly-spaced, large dark brown crescent-shaped flammules; protoconch mammillate, protracted, light orange in color; aperture narrow, purple within.

**Etymology:** Named for Mr. Leonard C. Hill of Miami, Florida.

**Discussion:** *Conus hilli* is most similar to, and apparently is a close relative of, *Conus kulkulcan* Petuch, 1980 from the Bay Islands of Honduras. The new species differs from *C. kulkulcan*, however, in having a lower, flatter spire, and in having a squatter, less elongated shape. The spire whorls and shoulder of *C. kulkulcan* are marked with numerous fine, dark brown hairlines, but these are absent on *C. hilli*. *Conus kulkulcan* is also a textured shell, having spiral rows of tiny pustules around the body whorl. *Conus hilli*, on the other hand, is an untextured shell, having a highly polished, shiny body whorl. As in the case of the last two new cones in this paper, *Conus hilli* forms an interesting species trio with closely-related Honduran and Colombian species. This complex, then, includes *C. kulkulcan* from Honduras, *C. hilli* from Panama, and *C. colombianus* Petuch, 1987 from northern Colombia. Other related species in this close-knit Caribbean complex include *C. jucundus* Sowerby, 1857 (= *C. abbotti* Clench, 1942) and *C. inconstans* E. A. Smith, 1877 from the Bahamas, *C. arangoi* Sarasua, 1977 from Cuba, Cay Sal, and Turks and Caicos, *C. cardinalis* Hwass, 1792 and *C. cidaris* Kiener, 1845 from Hispaniola and the West Indian Arc, *C. mayaguensis* Nowell-Usticke, 1968 from the Dominican Republic and Puerto Rico, *C. harasewychi* Petuch, 1987 from Palm Beach, Florida, and possibly *C. abrolhosensis* Petuch, 1987 from the Abrolhos Archipelago of Brazil.

*Conus portobeloensis* new species  
(figures 34, 35)

**Material examined:** Holotype—Length 31 mm, trawled by commercial fishermen from 30 m depth off Portobelo, Panama, USNM 860545.

**Description:** Shell elongate, subpyriform, with low spire; earliest, postnuclear spire whorls protracted, becoming flattened during ontogeny; shoulder sharply angled, edged with small but distinct carina that projects beyond shoulder margin; body whorl smooth and shiny, with 20 large, raised cords around anterior quarter; spire whorls smooth; shell color white, marked with intermittent longitudinal flammules of pale orange-tan; longitudinal flammules, in turn, overlaid with scattered darker tan dots and dashes; anterior end of body whorl pale yellow-orange; spire white, with scattered amorphous flammules of dark orange-tan; midbody marked with clear white band; interior of aperture white; protoconch and early whorls dark orange; periostracum thin, tan, silky in texture.

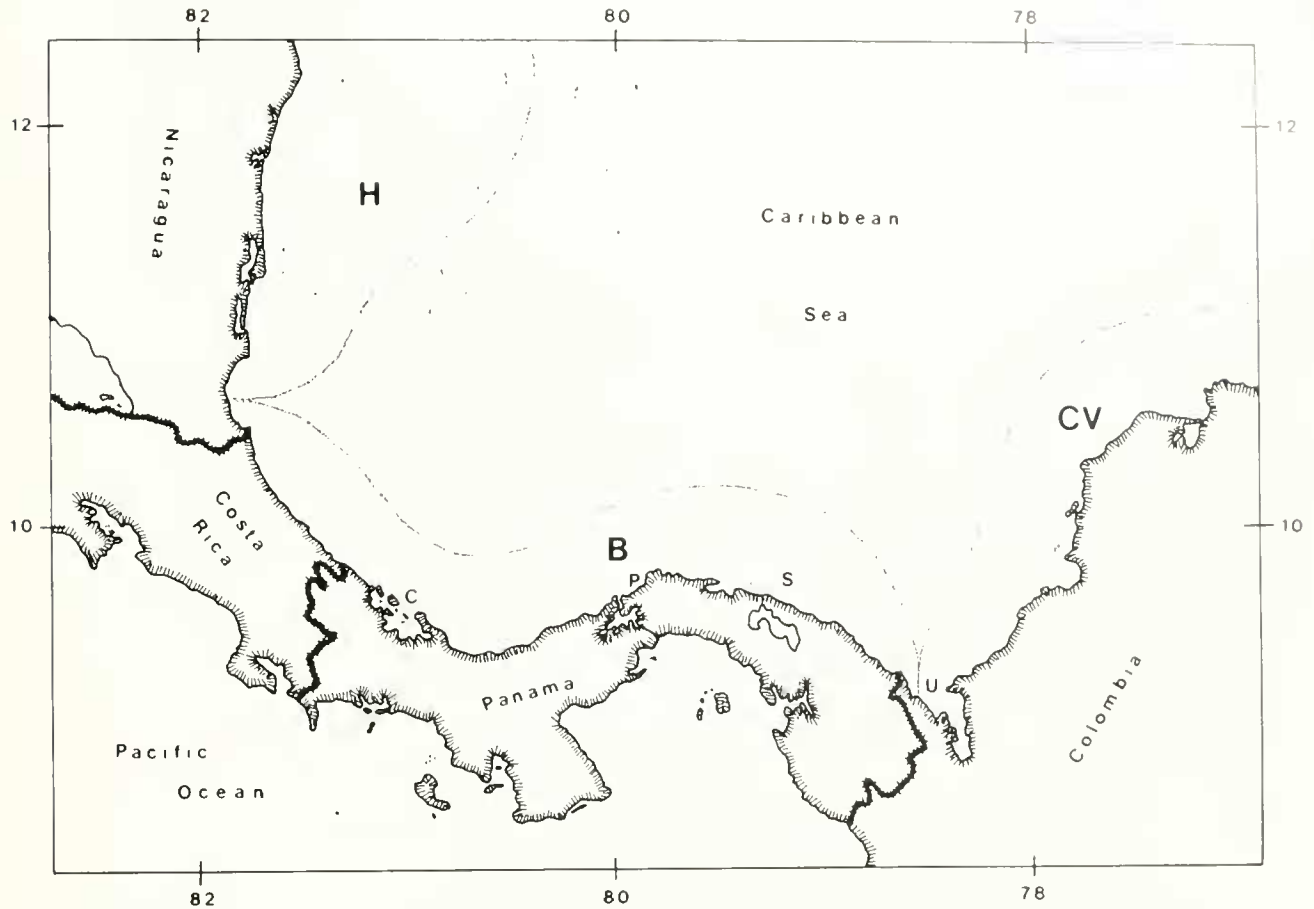
**Etymology:** Named for the city of Portobelo, off of which the holotype was collected.

**Discussion:** At first glance, *Conus portobeloensis* appears to be related to the *C. garciai-ernesti-cingulatus* species complex, particularly in color pattern. Based upon the presence of a shoulder carina and a subpyriform body form, however, *C. portobeloensis* appears to be more closely related to *C. commodus* A. Adams, 1854 (reillustrated by Petuch, 1987: plate 10, figures 18, 19) from off Roatan Island, Honduras, and may be the Panamanian analogue. *Conus portobeloensis* differs from the Honduran species in being a larger, more elongated shell and in having a color pattern of orange-tan flammules and dots. The new Panamanian species is also similar to *C. paraguana* Petuch, 1987 from the Gulf of Venezuela, as both species have an orangish dashed color pattern and both have a clear white midbody band. *Conus portobeloensis* differs from *C. paraguana*, however, in being a much larger, broader species with a wider and more sharply angled shoulder.

*Conus rosemaryae* new species  
(figures 34, 35)

**Material examined:** Holotype—Length 25 mm, trawled by commercial fishermen from 85 m depth off Portobelo, Panama, USNM 860546; Paratype 1—length 24 mm, same depth and locality as holotype, Leonard Hill collection, Miami, Florida.

**Description:** Shell small for genus, extremely pyriform, turnip-shaped, wide across shoulder; shoulder carinated; spire moderately protracted, with concave whorls; body whorl polished and shiny, faintly ornamented with numerous low threads; spire whorls smooth; anterior third of body whorl sculptured with 10 deeply-impressed wide spiral sulci; body whorl white, overlaid with dense network of large, amorphous, bright yellow-orange flammules; some specimens (paratype) overlaid with scattered rows of dots; spire whorls white with scattered large, amorphous yellow-orange patches and flammules; anterior tip of shell pale orange; protoconch and early whorls orange; interior of aperture white; periostracum thin, transparent tan, smooth.



**Figure 42.** Map of the southwestern Caribbean Sea and the Panamanian Isthmus, showing the distribution of Caribbean molluscan faunal subregions. H = Honduran Subregion; B = Blasian Subregion; CV = Colombian-Venezuelan Subregion (taken, in part, from Petuch, 1988). Blasian geographical landmarks include the Laguna de Chiriqui (C), Portobelo (P), San Blas Archipelago (S), and the Golfo de Uraba (U). As shown here, the Blasian Subregion may extend northward to the Costa Rica-Nicaragua border area, in the vicinity of San Juan del Norte, Nicaragua.

**Etymology:** Named for Ms. Rosemary Adams of Sunnymeade, California, who assisted Mr. James Ernest in the collection of the new Blasian species.

**Discussion:** Of the known Blasian Conidae, *Conus rosemaryae* is certainly one of the most distinctive. The pyriform turnip shape of this new species is unique among the Caribbean Panamanian cones. In general body form, *C. rosemaryae* most closely resembles *C. gibsonsmithorum* Petuch, 1986 from the Goajira Peninsula of Colombia and the Gulf of Venezuela, but differs in being a larger shell with a more elongated, tapered body whorl, and in being narrower across the shoulder. Although both *C. gibsonsmithorum* and *C. rosemaryae* have color varieties with rows of dots, *C. rosemaryae* is a more heavily patterned, more colorful species, with large orange flammules (as in the holotype) covering most of the shell. The new species is also similar to *C. sennottorum* Rehder and Abbott, 1951 from the Gulf of Mexico off Yucatan, but differs in being a smaller, more slender, and more brightly colored shell.

#### Turridae

*Fusiturricula* Woodring, 1928

*Fusiturricula sunderlandi* new species  
(figures 40, 41)

**Material examined:** Holotype—Length 33 mm, trawled by commercial fishermen from 70 m depth off Portobelo, Panama, USNM 860547.

**Description:** Shell extremely elongated, slender, and fusiform; spire very elevated and protracted, turriculate; shoulder sharply-angled, with 12 oval-shaped knobs per whorl along periphery; subsutural area sloping; body whorl below shoulder knobs ornamented with 10 large beaded spiral cords; subsutural area ornamented with numerous extremely fine spiral threads; margin of suture bordered by bands of small, closely-packed oblong pustules; siphonal canal elongated, narrow, straight, ornamented with numerous fine, beaded, spiral threads, shell color uniformly pinkish-tan; aperture and columella white.

**Etymology:** Named for Mr. Kevan Sunderland of Fort Lauderdale, Florida, who kindly donated the holotype.

**Discussion:** *Fusiturricula sunderlandi* is most similar to the Panamic species, *F. armilda* (Dall, 1908), but differs in being a more slender, fusiform shell with a more elongated body whorl. In *F. armilda*, the body whorl pinches-in abruptly at the junction with the siphonal canal, while in *C. sunderlandi*, the body whorl tapers gradually into the siphonal canal. The two species possibly form a cognate pair.

*Knefastia* Dall, 1919

*Knefastia hilli* new species  
(figures 38, 39)

**Material examined:** Holotype—Length 50 mm, trawled by commercial fishermen from 70 m depth off Portobelo, Panama, USNM 860548.

**Description:** Shell large, robust, fusiform; spire very high, elevated, distinctly turriculate and scalariform; subsutural area flattened, producing stepped spire whorls; whorls ornamented with 8 large, rounded, elongated, varix-like axial knobs; body whorl ornamented with 12 large, pustulated spiral cords with one or two fine, pustulated secondary cords in between; pustulated cords overlie large axial knobs; siphonal canal short, stubby, ornamented with 8 large, pustulated cords; fine cords and threads present between main siphonal cords; outer lip with numerous lirae along inside edge; anal notch small, narrow; shell color orange-brown with darker brown knobs; primary cords on spire, body whorl, and siphonal canal white or light tan; body whorl-siphonal canal junction marked with wide, dark brown band; anterior end of siphonal canal circled by wide, dark brown band; aperture and columella pale orange-tan.

**Etymology:** Named for Mr. Leonard C. Hill of Miami, Florida.

**Discussion:** *Knefastia hilli* is the first-known living Atlantic species of this primarily Panamic genus. *Knefastia hilli* is most similar to *K. olivacea* (Sowerby, 1833), which ranges from the Gulf of California southward to southern Ecuador. The new Caribbean species differs from *K. olivacea* in being a smaller shell with larger and more pronounced axial knobs, and in having finer and more numerous spiral cords. The two species, however, are very similar and, no doubt, represent Panamic-Caribbean cognates.

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